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JONES DAY  
222 EAST 41ST ST  
NEW YORK, NY 10017

EXAMINER

LY, CHEYNE D

ART UNIT PAPER NUMBER

1631

DATE MAILED: 10/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/015,167

Applicant(s)

USUKA ET AL.

Examiner

Cheyne D Ly

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 14, 15, 17, 20-22, 39, 40, 42, 45-47 and 58 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14, 15, 17, 20-22, 39, 40, 42, 45-47, and 58 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. Applicants' arguments filed September 16, 2004 have been fully considered but they are not deemed to be persuasive. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.
2. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.
3. The cancellation of claims 1-13, 16, 18, 19, 23-38, 41, 43, 44, 48-57, and 59-77 has been acknowledged.
4. Claims 14, 15, 17, 20-22, 39, 40, 42, 45-47, and 58 are examined on the merits.

### **CLAIM REJECTIONS - 35 U.S.C. § 112, SECOND PARAGRAPH**

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 14, 15, 17, 20-22, 39, 40, 42, 45-47, and 58 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
7. Specific to claim 14, lines 17 and 24, the antecedent basis for the phrase "said genotypic data structure" is not clear. It is noted that line 5 recites "establishing a genotypic data structure" and lines 10-11 recite a step for "repeating...identifying one or more genotypic data structures." The antecedent basis for the phrase "said genotypic data structure" in lines 17 and 24 are unclear due to the two separate steps for establishing different genotypic data

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structures. It is unclear whether the genotypic data structure generated from the respective steps are distinct or the same. The same issue is present in claims 17, 20, 22, 39, 42, 45-47, and 58. Claims 15, 21 and 40 are rejected for being dependent from claim 14, 20, or 39.

8. Claim 46 recites the limitation "said function" in line 26. There is insufficient antecedent basis for this limitation in the claim.

9. Specific to claim 46, Applicant uses the abbreviations of "Z" in lines 28-29.

Abbreviations in claims are vague and indefinite unless accompanied by the full name, usually in parentheses.

### **CLAIM REJECTIONS - 35 USC § 101**

10. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

11. Claims 14, 15, 17, 20-22, 39, 40, 42, 45-47, and 58 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory algorithm type subject matter.

12. Claims 14, 15, 17, 20-22, 39, 40, 42, 45-47, and 58 are rejected because said claims are directed to a method comprising algorithmic steps for manipulating genotypic and phenotypic data without any physical alteration step, which is considered to be non-statutory subject matter. "For example, a computer process that simply calculates a mathematical algorithm that models noise is nonstatutory. However, a claimed process for digitally filtering noise employing the mathematical algorithm is statutory." (MPEP § 2106 (IV)(B)(2) (b), part ii). Similar to the nonstatutory example above, the instant invention comprises algorithmic steps for manipulating genotypic and phenotypic data without any physical alteration resulted from said analysis or modeling steps.

13. It is acknowledged that the instant invention is directed a computer program and product comprising processes for manipulating genotypic and phenotypic data. The processes have been reasonably construed as algorithmic processes occurring within a computer system wherein said processes does not cause any physical alteration outside of said computer system. Therefore, "such activity is not determinative of whether the process is statutory because such transformation alone does not distinguish a statutory computer process from a nonstatutory computer process" (MPEP § 2106 (IV)(B)(2) (b), part ii).

### **CLAIM REJECTIONS - 35 USC § 103**

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 14, 15, 39, 40, and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satagopan et al. (1996) taken with Almasy et al. (1998).

17. Satagopan et al. describes a method for associating a phenotype with one or more candidate chromosomal using a multi-locus model (Abstract etc., and page 806, lines 1-2). The method of Satagopan et al. is directed to using phenotypic data for *Brassica napus* (species) wherein “[a]t each marker locus and the putative QTL, associate 1 with one homozygous parent type, -1 with the other homozygous parent type and 0 with the heterozygote” (strains). The phenotypic and genotypic data structures are defined by the linear model (structure) of equations 1-6 (establish) wherein Tables 1-3 are populated (database) with data from said model. The location of the putative locus, its phenotype and effects can be estimated from said model by assuming an appropriate distribution for the traits (variation) (pages 806-807, QTL Model §, and pages 810-811, The data and model structure). The method of Almasy et al. has been implemented with the SOLAR software package available at <http://www.sfbr.org> website (page 1210, column 2, last paragraph, as in instant claim 14, lines 1-7 and 17-20; claim 39, lines 1-15; and claim 46, lines 1-15).
18. The models are being compared to a correlation value wherein the ratio of marginal probabilities of the two compared models is the Bayes factor (page 809, column 2, lines 29-47), as in instant claim 14, lines 8-9; claim 39, lines 16-17; and claim 46, lines 16-17.
19. Satagopan et al. describes five repeated runs of the chain using normal and multivariate t weighting densities. Estimates from multivariate t weights were found to be more stable (higher) than normal weights (page 814, column 2, lines 4-10), as in instant claim 14, lines 10-16; claim 39, lines 18-27; and claim 46, lines 18-26.
20. The method of Satagopan et al. is directed to a multi-locus model for fitting quantitative trait and molecular marker data (Abstract etc.). The QTL distances range from 0 to the

maximum length  $D$ . The QTL genotypes are elements of a discrete space. Each additive and dominance, and the overall mean  $\mu$  vary in the real line, and the environmental variance (page 807, column 2, Parameter Estimation §). Due to the limitation of “center” not being specifically defined in the specification, the cited description above has been reasonably construed to be some distance from the “center”, as in instant claim 14, lines 21-27; and claim 39, lines 28-29.

21. Satagopan et al. provides a method comprising Gaussian distributions (page 811, column 2, lines 7-9), as in instant claim 15 and 40.

22. Due the vague and indefinite issue directed to the limitations of claim 46, lines 27-29, said limitations have been construed reasonably broad for the instant prior art rejection.

Therefore, the method of Satagopan et al. cited above has been reasonably construed to be consistent with the limitations of claim 46, lines 27-29.

23. However, Satagopan et al. does not describe the limitation of weighting each variation wherein variations further from the center are “downweighted”.

24. Almasry et al. describes a method for improving the power to detect QTLs as directed to multipoint information (multi-locus) (page 1201, column 2, lines 26-29). Further, the results from well known in the art methods can be averaged by the use of the likelihood of the imputed marker genotype vector as a weighting factor (page 1201, column 2, lines 7-10).

25. Almasry et al. describes that the correlation between  $k^2$  values decays more rapidly with genetic distance than does for the  $H^2$  values. Therefore, the incorporation of dominance effects into a variance-component model will be most useful when the QTL is comparatively close to a genetic marker (center) (page 1205, column 1, line 3, to column 2, line 3, and

Figure 3). The above cited description from Almasy et al. has been reasonably construed as the variance-component closer to the genetic marker (center) weights more than the variance-component further from genetic marker (center) (downweighted), as in instant claim 14, lines 28-31; and claim 39, lines 30-33.

26. An artisan of ordinary skill in the art at the time of the instant invention would have been motivated by the improvement emphasized by Almasy et al. to improve on the method of Satagopan et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to use the method for associating a phenotype with one or more candidate chromosomal using a multi-locus model as disclosed by Satagopan et al. and Almasy et al.

### CONCLUSION

27. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

28. Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also



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check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

29. For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to C. Dune Ly, whose telephone number is (571) 272-0716. The examiner can normally be reached on Monday-Friday from 8 A.M. to 4 P.M.

31. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Woodward, Ph.D., can be reached on (571) 272-0722.

C. Dune Ly  
10/14/04

*Andrius N. Marschel* 10/15/04  
ANDRIUS N. MARSCHEL  
PATENT EXAMINER